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Radiogenic isotope geochemistry applied to the characterization of the provenance of sediments transported by icebergs during the last glacial period: A study in the Galicia Interior Basin

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In the scope of a collaboration with the University of Vigo, the Geobiotec research unit has contributed with studies on the Sr and Nd isotopic fingerprints of the sediments deposited in the Galicia Interior Basin in the last six Heinrich Stadials (HS; climatic oscillations that culminated by massive discharge of icebergs to the North Atlantic during the last glacial period). Strongly negative ε_{Nd} values during HS1 (~15-16 ka), HS2 (~23.5-25 ka), HS4 (~37.5-40 ka) and HS5(~43.8-45.5 ka) are consistent with a Canadian source for the sediments dropped by icebergs. In contrast, higher ε_{Nd} and relatively low $^{87}Sr/^{86}Sr$ values were recorded during HS3, HS5a, HS6, but also in the initial stages of HS1 (~16-17.5 ka), HS2 (~25-26.3 ka) and HS4 (~40-42 ka), pointing to an European provenance of those sediments. The whole set of data suggests that large European melt-water discharges in the beginning of HS1, HS2 and HS4 could have contributed to the weakening of the Atlantic Meridional Overturning Circulation and, consequently, to the collapse of the ice sheets covering NW Europe and NE America[1].

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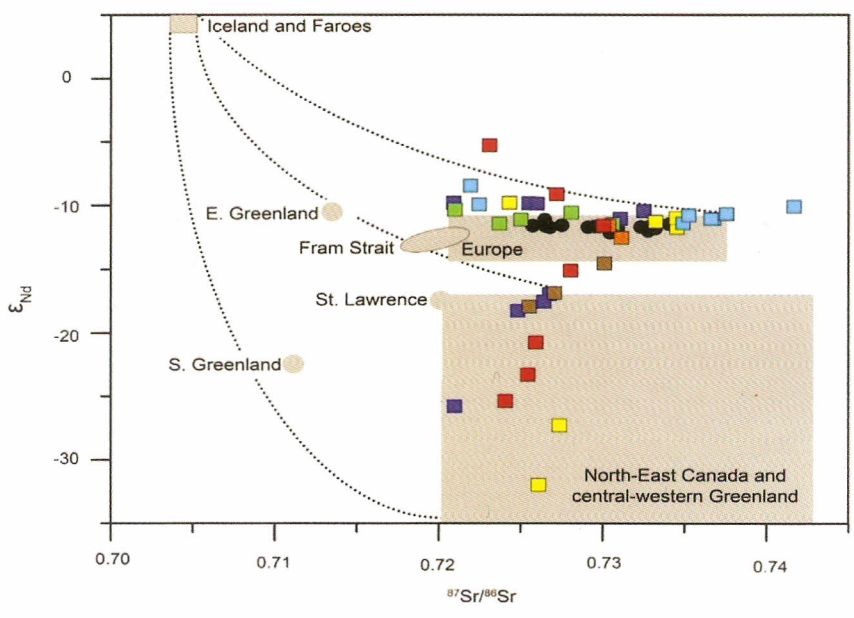

FIGURE 1

ε_{Nd} vs $^{87}Sr/^{86}Sr$. Black circles - layers without HS sediments. Solid squares - HS1 (dark-blue), HS2 (red), HS3 (green), HS4 (yellow), HS5 (brown), HS5a (orange) and HS6 (light-blue). Grey fields - possible source areas adapted from several compilations in the literature. Dotted lines represent potential mixing hyperboles between sources.

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